



Colorado Department
of Public Health
and Environment

August 10, 2005

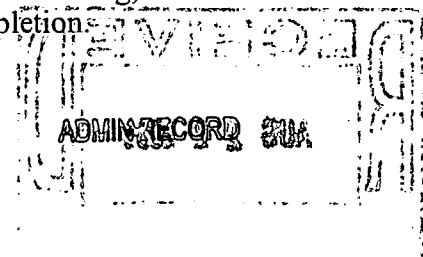
Honorable Nancy McNally, Mayor
City of Westminster
4800 West 92nd Avenue
Westminster, CO 80031

Dear Mayor McNally,

Thank you for your letter of July 25, in which you forwarded technical questions concerning the Original Landfill Interim Measure/Interim Remedial Action (IM/IRA) and the Ground Water IM/IRA. Please see our responses to your technical question in Attachment 1 to this letter. A "Summary of QA/QC Field Tests" for the Original Landfill construction is included as Attachment 2.

We appreciate your desire to clarify outstanding issues and bring closure to the items identified. We have held meetings with staff from Westminster and Broomfield and the Woman Creek Reservoir Authority (WCRA) specifically to discuss their technical concerns, and we continued to keep in mind the issues raised by them as we reviewed the Groundwater IM/IRA, the Original Landfill design and other documents of concern.

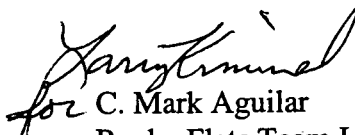
We participated in an extensive technical meeting on April 20 with personnel from these organizations and their consultants. At the cities' request, attendance was limited to technical staff to enable in-depth discussion. This restriction on attendance was unusual, in that we generally meet with all parties at the same time, however, this was an effort to maximize time for discussion of the cities'/WCRA's specific technical issues. It is our understanding that the cities/WCRA also met with DOE staff to go over their technical concerns shortly afterward. A third technical meeting took place on June 6 at the Broomfield City Hall to further discuss questions concerning the Groundwater IM/IRA and Original Landfill design. Present at this meeting were staff from the cities/WCRA and their consultants, as well as CDPHE, EPA and DOE/Kaiser-Hill. We have since issued comments and approved the Groundwater IM/IRA and as of this writing, construction of the Original Landfill interim measure is nearing completion.




At these meetings, technical staff from CDPHE and EPA have indicated that our agencies shared some of the same technical questions raised by the consultants retained by the cities and WCRA, and have been working toward achieving resolution during the design/construction phases.

If you have any further issues or questions, please contact us.

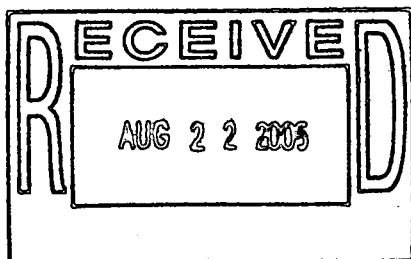
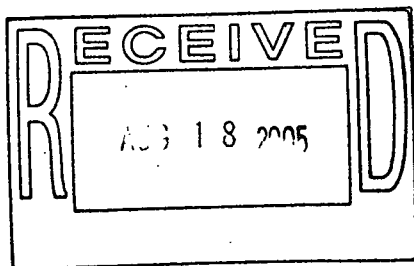
Sincerely,


for C. Mark Aguilar
Rocky Flats Team Leader
EPA


Carl Spreng
RFCA Project Coordinator
CDPHE


David A. Kruchek
Acting Rocky Flats
Oversight Unit Leader
CDPHE

cc: John Rampe, DOE
Dave Shelton, K-H
Mark Sattelberg, USF&WS
David Abelson, RFCLOG
Bud Hart, Woman Creek Reservoir Authority
Al Nelson, Westminster
Shirley Garcia, Broomfield
Administrative Record, T130G



Attachment 1

We realize the cities may not have had access to the most current documents, including the final versions of the GW IM/IRA, 2005 IMP, and Original Landfill IM/IRA and Final Design. The responses provided below are based on the most recent information provided by the site.

1. Groundwater Monitoring - areas around the OLF for GW monitoring have not been identified to our satisfaction

One upgradient and three downgradient monitoring wells were selected with input from CDPHE and EPA personnel. In addition, an AOC monitoring well is located approximately 200 to 300 feet due east and downgradient of the OLF. These monitoring locations have been presented in the Final Groundwater IM/IRA, July 2005 and the Final OLF IM/IRA, April 2005.

2. Groundwater Screening Process – eliminates several AOIs and corrective actions based on SWPRGs

The screening process was revised in the Final GW IM/IRA. In addition, Appendix E in the Final GW IM/IRA presents a discussion on the mobility of Pu and Am in the environment. Based on comments received on the Draft GW IM/IRA, the RAO utilizing SWPRGs has been deleted (Final GW IM/IRA, Section 11, page 116).

3. Groundwater Sampling Pu and Am – DOE screens out Pu and Am and does [not] address their impact on groundwater and surface water

The 2005 IMP includes newly installed monitoring wells downgradient of buildings 371 and 771. Groundwater monitoring for Pu and Am will be performed in monitoring wells downgradient of buildings 371, 771 and 774. In addition, there are downgradient surface water monitoring stations that will be sampled for Pu and Am.

4. Groundwater Lower Aquifer – no deep aquifer monitoring is proposed - Data should be provided to validate the assumption

This issue is adequately addressed in the Final GW IM/IRA in Section 11, pages 119 and 120, as well as in Appendix A. The agencies concur that there is no significant connection between the deep aquifer and the shallow contaminated aquifer.

5. Groundwater Seeps – seeps not monitored in the current plan

In general, based on the Final GW IM/IRA, areas with shallow groundwater and flow paths associated with contaminate plumes are monitored instead of seeps. This approach appears adequate, as seeps tend to be inconsistent and intermittent, whereas shallow groundwater is not.

6. Groundwater ARARs have not been met

This comment has been adequately addressed in Section 11, pages 114 and 115, as well as in Section 11, pages 1 through 6 of the “Responses to General Comments.” The agencies feel this discussion is adequate in explaining the RFCA regulatory approach. In addition, the Final GW IM/IRA has been revised to clarify that drinking water standards are incorporated as ARARs (Section 3.4, page 3-8).

7. “The [Groundwater] scientific justification for the decision made in the IM/IRA are vague.”

Based on the Final GW IM/IRA, Section 11, pages 1 through 6 of the “Response to General Comments”, the agencies feel this issue is adequately addressed. The GW IM/IRA does follow RFCA/ALF as the document clearly describes proposed near-term actions and alternatives as well as long-term goals. The 2005 IMP addresses long-term monitoring on a site-wide basis.

8. Groundwater Regulatory Requirements – not consistent with CDPHE surface water standards

Based on comments received on the Draft GW IM/IRA, this issue has been addressed by removing the RAO utilizing SWPRGs (Final GW IM/IRA, Section 11, page 111).

9. Groundwater Ecological Endpoints – IM/IRA gives no consideration to ecological endpoints

This issue is addressed adequately in Section 11, page 111. While not the intent of the GW IM/IRA, ecological resources and impacts are adequately addressed in Section 8.5 of this document. The Site-wide Comprehensive Risk Assessment will address potential risks to ecologic resources and endpoints in significantly more detail.

10. VOCs in groundwater discharge to surface water and are not effectively monitored

This issue is adequately addressed as new locations for VOC monitoring have been incorporated (Final GW IM/IRA) or are currently proposed (2005 IMP).

11. Woman Creek Surface Water Management – sources of surface water and groundwater contamination should be sampled and treated prior to entering Woman Creek

Where feasible or practicable, identified sources of contamination have been remediated or eliminated by accelerated actions, such as the OLF, and 903 Pad and Lip Area soil remediation project.

In addition, monitoring locations are located throughout the Woman Creek drainage for the purpose of identifying potential releases to Woman Creek. To list a few, GS59 (POM5) and SW027 (POE3) are located upgradient of Pond C2 to measure potential contamination sources that may enter Woman Creek. In addition, GS01 (POC1) and GS31 (POC5) are located downgradient of Pond C2 and serve to monitor compliance with surface water quality standards. These stations would provide information on the concentration of potential contamination in the Woman Creek drainage and possibly leaving the site. In addition, the Woman Creek Reservoir was constructed to protect public water supplies from any potential releases.

12. Woman Creek Surface Water Management – reservoirs should be operated to release small batches of water

As stated in your letter, this issue appears to be adequately addressed by DOE and the cities are awaiting documentation.

13. Woman Creek Sediment and Drainage Characterization

The sediment in the C-series ponds has recently been sampled and some of the preliminary results have been received. The site has also recently completed sediment sampling in the A and B-series ponds. The surface water-sampling network is currently being evaluated for adequacy and coverage (FY 2005 IMP).

14. Woman Creek Drainage Maintenance – disturbed areas in the IA should be revegetated to control erosion

The agencies concur with this comment and DOE's response that revegetation and erosion control practices are being implemented.

15. Woman Creek – surface water modeling adequacy

The State reviewed the SWWB model, and the results of the modeling effort were accepted as a "reasonable" model for a good estimate of the range of expected hydrologic behavior.

16. Woman Creek – C1 and C2 ponds not evaluated in the EA

NEPA requirements state that the potential impacts of a proposed action be considered and documented in an EA or EIS. In addition, NEPA allows for a Categorical Exclusion, which means a category of actions, which do not individually or cumulatively have a significant effect on the human environment. The proposed action of dam notching at Pond C1 did not significantly impact the environment and no action was performed on Pond C2. The requirements were interpreted appropriately.

17. Woman Creek Surface Water Management – diversion of surface water into Pond C2 for detention

Monitoring locations are located throughout the Woman Creek drainage for the purpose of identifying potential releases to Woman Creek. To list a few, GS59 (POM5) and SW027 (POE3) are located upgradient of Pond C2 to measure potential contamination sources that may enter Woman Creek. In addition, GS01 (POC1) and GS31 (POC5) are located downgradient of Pond C2 and serve to monitor compliance with surface water quality standards. These stations would provide information on the concentration of potential contamination in the Woman Creek drainage and possibly leaving the site. In addition, the Woman Creek Reservoir was constructed to protect public water supplies from any potential releases.

18. C2 Detention Capacity for Woman Creek – C2 does not have adequate detention capacity to contain a major storm event

Pond C-2 is presently used to contain waters primarily coming from the SID. Woman Creek bypasses C-2. Water coming down the creek does not flow into C-2. However, any discharges from C-2 would flow into Woman Creek.

Pond C-1 is on Woman Creek and has been notched. It provides little retention capacity. Downstream of C-2, Woman Creek enters an area of low topographic change. Any flood coming out of Woman Creek would lose impetus in this region. In addition, the Woman Creek Reservoir lies down stream of this flat area and was constructed specifically to address flows discharging from this area.

19. Woman Creek Surface Water Management - disturbed areas in the IA should be revegetated to control erosion

Refer to response to comment number 14.

20. Regulatory requirements. "does not consider installation of a landfill closure consistent with...RCRA as is applicable to the site."

The Original Landfill was closed in 1968. RCRA Subtitle C applies to landfills in existence on November 19, 1980. Due to the effective dates of operation, RCRA requirements are not "applicable" at this site but were deemed "relevant and appropriate." Accordingly, the ARARs analysis evaluated each requirement as to relevancy and appropriateness to the site.

21. Proposed landfill closure does not contain or isolate the waste from groundwater.

The intent of the remedy is to prevent direct contact with contents, control erosion caused by stormwater run-on and run-off, and minimize the need for maintenance. Groundwater moving through the landfill is monitored at three (3) downgradient wells and one (1) upgradient well, as per RCRA regulations. The three downgradient wells are designated as compliance points. Surface water is also monitored for the complete suite of contaminants.

The landfill cover was designed to function with minimum maintenance, promote drainage and minimize erosion or abrasion of the cover, accommodate settling and subsidence so that the cover's integrity is maintained. In addition, the closed landfill will be subject to a long term monitoring and maintenance program with specific compliance requirements.

22. Stability of the landfill and buttress (area is in landslide and floodplain area, flood/integrity of buttress)

These two concerns were identified by regulators early in the process; an additional geotechnical investigation was required and performed in 2004; calculations of flood level heights were also performed. The final design incorporates measures to protect the landfill cover (subgrade compaction to avoid subsidence) and buttress (reducing slope to 3:1 and toe reinforcement in the lower 30 ft).

The design takes into consideration that the Original Landfill is in an area prone to landslides and that the toe of the "buttress" will be in the floodplain in a major flood event. To provide adequate slope stability, a substantial earthen buttress was designed and constructed to stabilize the re-graded landfill slope. To provide for scour resistance of the toe of the buttress (not the landfill) that may be inundated, an analysis was made to determine the high-water level due to a 100-year storm event. Based on this analysis, the design provided for reinforcement of the portion of the toe of the buttress slope with heavy duty permanent erosion protection. This protection was extended above the required high-water level to provide an additional safety factor.

It is therefore highly unlikely, based on the current design, that the integrity of the cap and buttress may be jeopardized in the event of a flood.

23. Surface water and groundwater management - groundwater and surface water coming through or over OLF not being monitored and treated prior to entering Woman Creek.

Groundwater is monitored by 3 downgradient and 1 upgradient wells; surface water is monitored for the full suite of contaminants. As an additional measure, to have a documented baseline specific to the OLF project, EPA is in the process of performing detailed sampling of surface water and sediments at 10 sampling locations adjacent to the OLF.

With respect to monitoring: Both surface water and groundwater will be monitored in accordance with an approved monitoring plan. Monitoring wells immediately down-gradient of the toe of the buttress are designated points of compliance.

With respect to treatment of surface water prior to entering Woman Creek: It is expected that runoff from the completed soil cover, constructed entirely of at least 2 feet of vegetated clean Rocky Flats alluvium overlying at least 1 foot of compacted clean grade-fill soil, will be uncontaminated and will not require treatment. However, as indicated previously, surface water will still be monitored for a full suite of potential contaminants.

With respect to treatment of groundwater prior to entering Woman Creek:

The landfill has a buttress drain which is designed to prevent groundwater from being discharged directly into Woman Creek. Groundwater flowing through the landfill will be intercepted by the buttress drain and continue to flow as part of the groundwater system underlying Woman Creek. The groundwater immediately adjacent to the toe of the buttress fill will be monitored by three down gradient wells in accordance with an approved monitoring plan. These monitoring wells will be "points of compliance" for this interim remedial action and will be monitored for a full suite of potential contaminants.

24. Biointrusion (large number of animal burrow holes - without biointrusion layer, animals will continue)

The animal burrow holes referred to could not be verified. The cover, as designed (with an 18 percent south-facing slope, 2 feet of vegetated Rocky Flats alluvium, and at least 1 foot of clean soil re-grade fill) is an unappealing habitat for the burrowing animals known in the area. Therefore, it is unlikely that a large number of burrowing animals will inhabit the cover. However, a monitoring program will be implemented to identify burrowing animals and to perform mitigation measures, if needed.

25. Upstream/downstream contamination (many contaminants monitored downgradient but not monitored upgradient....)

EPA is in the process of sampling and testing the surface water and sediment in Woman Creek at 10 locations in the immediate vicinity of the OLF.

26. VOC Fate and Transport modeling (no specifics to the model, no sensitivity analysis)

Given that the 3 downgradient monitoring wells are designated as points of compliance, and will give an actual account of the remedy performance, it was not necessary to further elaborate on the VOC model, as any model is theoretical.

Additional details are available and will be provided as requested. However, due to the inherent limitations of contaminant transport modeling in general, it is expected that additional modeling will not provide any new information. The actual performance of the closed landfill will be monitored in the long term monitoring plan. The five year review will assess the results and evaluate the appropriateness of the remedy. Specifically, groundwater, surface water, sediment, erosion loss, and vegetation will be all monitored in accordance with an approved plan. If monitoring of the closed landfill indicates an impact that exceeds regulatory criteria, additional actions will be implemented.

27. Stability analysis (no evaluation of soil hydraulic properties)

This concern was identified by the regulators. Evaluation of soil hydraulic properties and groundwater/hydrostatic forces was required as part of the calculations for the final design. These were all evaluated and considered in the stability analysis. This information can be found in the final design documents.

28. OLF Cover QA/QC (lack of criteria for compaction levels, soil testing, no identified QA/QC hold points)

We believe the commenter did not have access to the final design documents. The buttress foundation was identified as a QA/QC hold point; soil quality and compactibility are described in detail in specifications.

QA/QC is a necessary and an integral component of this project and was implemented in accordance with EPA and CDPHE guidance. A summary table of QA/QC testing performed for the project is attached. Supporting data are in the Construction Completion Report (under preparation). In addition, QA/QC personnel were on-site every day observing the progress of construction.

The key hold point required specific approval prior to proceeding with construction. The foundation excavation of the buttress fill needed approval prior to placement of buttress fill on this foundation. Other significant construction

milestones also needed to be certified prior to proceeding. These included such milestones as (a) the top of re-grade surface, and (b) top of cover soil.

DRAFT

TABLE 6.1
SUMMARY OF QA/QC FIELD TESTS

Quality Control Item	QA/QC Item	QC Action	QA Action	Total QC Tests Taken	Total QA Tests Taken	Total Material Placed
Regrade & Cover Material	Atterberg Limits- (ASTM D 4318);	1/6,500 cy	1 per 20 QC	8 Regrade Including: 4 RFA 4 Pit Fines 8 Cover (RFA)	2 Regrade Including: 1 RFA 1 Pit Fines	44,000 cy Regrade Fill 39,126 cy RFA Cover Soil
	Sieve Analysis (with USCS Classification) ASTM D 422 ASTM D 5519	1/6,500 cy	1 per 20 QC	8 Regrade Including: 4 RFA 4 Pit Fines 2 Cover (RFA)	2 Regrade Including: 1 RFA 1 Pit Fines	44,000 cy Regrade Fill 39,126 cy RFA Cover Soil
Buttress Fill Material	Field Density ASTM D 2922	1/5,000 sqft/lift	1 per 20 QC	280 (+ Retests)	14 All of which passed	1,400,000 sqft/lift
	Field Density Verification ASTM D 1556 ASTM D 2167	1 per 20 Field Density Test	N/A	14	1	1,400,000 sqft/lift
	Atterberg Limits ASTM D 4318	1/6,500 cy	1 per 20 QC	9	3	44,854 cy
	Sieve Analysis (with USCS Classification) ASTM D 422 ASTM D 5519	1/6,500 cy	1 per 20 QC	9	3	44,854 cy
	Standard Proctor- ASTM D 698	1/6,500 cy	1 per 20 QC	9	3	44,854 cy
Drain Rock	Sieve Analysis (with USCS Classification) ASTM D 136 ASTM D 5519	1/6,500 cy	1 per 20 QC	4	1	6,459 cy
Geotextile	Unit Weight ASTM D 5261	1/100,000 sqft	1 per 20 QC	2 MQC Submittals	5	153,000 sqft

- QA was performed by Tetra Tech
- QC was performed by Golder and Associates
- Material placed was determined from survey information with the exception to the regrade fill which was estimated from truck loads.

6/8